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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,584	09/19/2003	Timothy J. Dalton	YOR920030247US1	5258
7590	10/05/2004		EXAMINER DICKY, THOMAS L	
Paul D. Greeley, Esq. Ohlandt, Greeley, Ruggiero & Perle, L.L.P. 10th Floor One Landmark Square Stamford, CT 06901-2682			ART UNIT 2826	PAPER NUMBER

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,584

Applicant(s)

DALTON ET AL.

Examiner

Thomas L Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 1-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Election/Restriction

1. Applicant's election with traverse of Group II, claims 1-28 in the reply filed on 07/26/2004 is acknowledged. The traversal is on the ground(s) that "a search relating [to] the semiconductor device will necessarily produce art relating to a method of manufacturing the semiconductor device." This is not found persuasive because when searching a method claim, the goal is not to "produce" art relating to the method of manufacturing. The goal is to not miss any art relating to the method of manufacturing. This goal can only be accomplished by searching areas dedicated to manufacturing methods.

The requirement is still deemed proper and is therefore made FINAL.

Oath/Declaration

2. The oath/declaration filed on 09/19/2003 is acceptable.

Drawings

3. The drawings are objected to by the PTO Draftsperson for the reasons noted on the attached Notice of Draftsperson's Patent Drawing Review, form PTO-948.

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Priority

4. Applicants have made no claim for priority.

Information Disclosure Statement

5. If applicant is aware of any relevant prior art, he/she requested to cite it on form **PTO-1449** in accordance with the guidelines set forth in M.P.E.P. 609.

Specification

6. The abstract of the disclosure is objected to because:

The abstract is not clearly indicative of the invention to which the claims are directed. The current abstract describes no features of the claimed device. Further, there is no need to describe method steps not relevant to the claimed invention. Correction is required. See MPEP § 608.01(b).

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

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1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

A. Claims 29-33 and 35-40 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1,7, and 8 of copending Application No. 10/627,794. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims in the other application, although narrower than the instant claims, nonetheless recite every limitation of the instant claims, to wit, a porous or dense low k dielectric selected from the group consisting of silicon-containing material formed from one or more of Si, C, O, F and H, PE CVD materials having a composition Si, C, O, and H, a fluorosilicate glass (FSG), C doped oxide, F doped oxide and alloys of Si, C, O and H; metallic lines and vias; and a liner material selected from the group consisting of: TiN, TaN, Ta, WN, W, TaSiN, TiSiN, WCN, Ru and a mixture thereof lining said metallic lines and vias.

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The applicant's claims do not distinguish over the disclosure of the '794 claims regardless of the process used to form the BEOL interconnect structure, because only the final product is relevant, not the recited process of a) forming a porous or dense low k dielectric layer on a substrate; b) forming single or dual damascene etched openings in said low k dielectric; c) placing said substrate in a first process chamber on a cold chuck at a temperature about -200 °C to about 25 °C; d) adding to said first process chamber a condensable cleaning agent (CCA) to condense a layer of CCA within said etched openings on said substrate; e) performing an activation step either by performing the activation step while the wafer remains cold at a temperature of about -200 °C to about 25 °C or by moving the substrate to a second process chamber on a cluster tool; and performing the activation step in said second process chamber.

Note that a "product by process" claim is directed to the product per se, no matter how actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

B. Claims 29-33 and 35-40 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1,2, and 7 of copending Application No. 10/639,989. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims in the other application, although narrower than the instant claims, nonetheless recite every limitation of the instant claims, to wit, a porous or dense low k dielectric selected from the group consisting of silicon-containing material formed from one or more of Si, C, O, F and H, PE CVD materials having a composition Si, C, O, and H, a fluorosilicate glass (FSG), C doped oxide, F doped oxide and alloys of Si, C, O and H; metallic lines and vias; and a liner material selected from the group consisting of: TiN, TaN, Ta, WN, W, TaSiN, TiSiN, WCN, Ru and a mixture thereof lining said metallic lines and vias.

The applicant's claims do not distinguish over the disclosure of the '989 claims regardless of the process used to form the BEOL interconnect structure, because only the final product is relevant, not the recited process of a) forming a porous or dense low k dielectric layer on a substrate; b) forming single or dual damascene etched openings in said low k dielectric; c) placing said substrate in a first process chamber on a cold chuck at a temperature about -200 °C to about 25 °C; d) adding to said first process chamber a condensable cleaning agent (CCA) to condense a layer of CCA within said etched openings on said substrate; e) performing an activation step either by performing

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the activation step while the wafer remains cold at a temperature of about -200 °C to about 25 °C or by moving the substrate to a second process chamber on a cluster tool; and performing the activation step in said second process chamber..

Note that a “product by process” claim is directed to the product per se, no matter how actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

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Claims 34 and 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 34 and 40 each contain the trademark/trade names Black Diamond TM, CoralTM, AuroraTM, Aurora ULKTM, Aurora ELKSTM, BDIITM, BDIIITM, methylsilsesquioxanesTM, siloxanesTM, 5109TM, 5117TM, 5525TM, 5530TM, DendriglassTM, OrionTM, TrikonTM. Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade name is used to identify/describe a porous or dense low k dielectric. Accordingly, the identification/description is indefinite.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 29-33 and 35-39 are rejected under 35 U.S.C. 102(b) as being anticipated by DIXIT ET AL. (4,884,123).

Dixit et al. discloses a BEOL interconnect structure having low via contact resistance, including a porous or dense low k dielectric 14 of (typically) silicon dioxide (thus selected from the group consisting of silicon-containing material formed from one or more of Si, C, O, F and H, PE CVD materials having a composition Si, C, O, and H, FSG, C doped oxide, F doped oxide and alloys of Si, C, O and H); metallic lines 22 and vias 24; and a liner material 20 selected from the group consisting of: TiN, TaN, Ta, WN, W, TaSiN, TiSiN, WCN, Ru and a mixture thereof lining said metallic lines 22 and vias 24. Note figures 1a-1d, 2, column 2 lines 61-65, column 3 lines 60-65, column 4 lines 1-12, 36-62, and column 5 lines 1-19 of Dixit et al.

The applicant's claims do not distinguish over the Dixit et al. reference regardless of the process used to form the BEOL interconnect structure, because only the final product is relevant, not the recited process of a) forming a porous or dense low k dielectric layer on a substrate; b) forming single or dual damascene etched openings in said low k dielectric; c) placing said substrate in a first process chamber on a cold chuck at a temperature about -200 °C to about 25 °C; d) adding to said first process chamber a condensable cleaning agent (CCA) to condense a layer of CCA within said etched openings on said substrate; e) performing an activation step either by performing the activation step while the wafer remains cold at a temperature of about -200 °C to about

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25 °C or by moving the substrate to a second process chamber on a cluster tool; and performing the activation step in said second process chamber.

Note that a “product by process” claim is directed to the product per se, no matter how actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

A. Claims 29-33 and 35-39 are rejected under 35 U.S.C. 102(b) as being anticipated by EDELSTEIN ET AL. (6,358,832).

Edelstein et al. discloses a BEOL interconnect structure having low via contact resistance, including a porous or dense low k dielectric 14 made of silicon dioxide, carbon-doped silicate glass or silsesquioxane glass, spin-on glass, fluorinated or non-fluorinated silicate glass, or diamond-like amorphous carbon (thus selected from the group consisting of silicon-containing material formed from one or more of Si, C, O, F and H, PE CVD materials having a composition Si, C, O, and H, a fluorosilicate glass (FSG), C doped oxide, F doped oxide and alloys of Si, C, O and H); metallic lines and

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vias 22; and a liner material 20 selected from the group consisting of TiN, TaN, Ta, W, TaSiN, TiSiN, WCN, and a mixture thereof lining said metallic lines and vias 22. Note figures 1A-1C, 3,4-9, column 5 lines 30-43,59-64, and column 6 lines 16-30 and 36-44 of Edelstein et al.

The applicant's claims do not distinguish over the Edelstein et al. reference regardless of the process used to form the BEOL interconnect structure, because only the final product is relevant, not the recited process of a) forming a porous or dense low k dielectric layer on a substrate; b) forming single or dual damascene etched openings in said low k dielectric; c) placing said substrate in a first process chamber on a cold chuck at a temperature about -200 °C to about 25 °C; d) adding to said first process chamber a condensable cleaning agent (CCA) to condense a layer of CCA within said etched openings on said substrate; e) performing an activation step either by performing the activation step while the wafer remains cold at a temperature of about -200 °C to about 25 °C or by moving the substrate to a second process chamber on a cluster tool; and performing the activation step in said second process chamber.

Note that a "product by process" claim is directed to the product per se, no matter how actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by

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process" claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TLD
09/04


Minhloan Tran
Primary Examiner
Art Unit 2826